

Application of
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ANTI-PERSONNEL DEVICE FOR WAR GAMING EXERCISES

RELATED APPLICATION DATA

This application is a non-provisional application for Letters Patent claiming the priority date of provisional application Serial Number 60/404,670 filed on 21 August 2002, the specification contained therein incorporated into this application by this reference thereto.

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to an anti-personnel device for use in war gaming exercise which comprises at least one launching mechanism for launching at least one projectile outwardly from the anti-personnel device.

2. Prior Art Statement

It is known to provide a frangible chamber containing a slurry of a dispersing agent and a plurality of particles serving as a marking agent wherein the frangible chamber is removed from a container, tossed manually in an arcuate path to strike a target or land in the vicinity thereof. For instance, see the U.S. Patent 4,684,137 issued on August 4, 1987 to Armer, Jr. et al. The slurry contained in the frangible chamber of this patent generally only splatters upon hitting an object thus limiting the marking range to an oblong having a major axis length in the direction of the throw of fewer than 10 feet. A gel capsule substantially equivalent to the Armer, Jr. et al., patent without the container is available from P&D Paintball Ordnance or Paintball Discounters.

It is also known to exude a slurry material through holes disposed through an egg-shaped device resembling a grenade wherein the marking slurry is initially contained in a container having a membrane as a wall adjacent the holes in the egg-shaped device. The membrane is ruptured by the explosive force forcing the membrane wall of the container outwardly toward the wall of the egg-shaped device. A flat version of the same device may be used as a land mine. For instance, see the U. S. Patent 3,492,945 issued on February 3, 1970 to Ernest Filippi. Clean up and recharging of this device is time consuming and messy thus limiting the use thereof to once per war game event.

It is further known to provide a paintball "Claymore" land mine comprising tubular device having an explosive charge at one end wherein paintballs are shot from the open end of the

tubular device in a dispersed pattern at a high velocity. For instance, see U.S. Patent 6,289,819 B1 issued on September 18, 2001 to Daniel Dolderer. The dispersion of paintballs is generally limited to a narrow cone as the tubular device functions like a barrel of a gun thus directing the paintballs into the narrow cone. Paintballs are also subject to rupture within the device as the explosive charge is often too powerful for launching paintballs. An array of tubular chambers discharging paintballs with a gas discharge is available as "The LOAD Paintball Launcher" at the website of Paintball Shooter for \$995.00. This device is too expensive for individuals in paintball games and requires cleaning prior to re-arming. Still another multiple tube launcher is available as the TRAP-II Booby Trap from the website of Redwolf Airsoft which uses a gas discharge to expel airsoft BB's. The TRAP-II has a directional limited cone pattern.

Additionally, it is known to provide a grenade like device having an inner pressurized chamber and an outer peripheral recess whereby when the grenade bottom strikes a surface after having been armed, releases a slurry from the inner pressurized chamber into the outer peripheral recess spraying outwardly from the outer peripheral recess through spray holes communicating with the outer peripheral recess. For instance, see the U. S. Patent 3,878,639 issued on April 22, 1975 to Sheelar, et al. A land mine issued to Armer, Jr. et al., in U. S. Patent 4,690,061 operates on a similar principle, however, the slurry chamber and the pressurized container are initially separated. In the Armer, Jr., et al., device, the trip wire releases a puncturing pin which punctures the membrane on a pressurized chamber releasing the pressurized contents into the slurry chamber thereby forcing the slurry up a tube and out spray holes arranged circumferentially around a spray head. A mine device operating on the principle described in the Armer, Jr, et al., device is available as the MASTER MINE from at the website of Major Paintball. Like the Filippi device above, these devices are also messy and require considerable time for cleaning.

Devices are known that expel paintballs from tubes associated with a pressurized container. In U. S. Patent 4,944,521, issued on July 31, 1990 to Donald Greeno, paintballs are adhesively held in arcuate chambers arranged about the peripheral surface of a grenade like device at the ends of the tubes wherein the tubes also contain a resilient plug force fit therein. A puncturing pin releases pressurized gas from a gas container into the tubes upon launching the

grenade and when the pressure builds up in the tubes sufficient to overcome the resistance of the resilient plug against the walls of the tubes, the plugs and paintballs are expelled. One drawback of this device is that the paintballs are not expelled from every chamber due to the frictional fit of the plugs and thus the grenade may not mark its intended target. A similar device for "airsoft" or miniature paintballs was patented by Woodall, et al., in U. S. Patent 5,996,503. A separate time delay mechanism allows for launching the grenade prior to discharge of the projectiles. Rearming the Woodall, et al., device is time consuming and costly. A war gaming land mine operating on the same principle is described and claimed in U. S. Patent 5,877,448 issued on March 2, 1999 to Denton, et al. No retainer plugs are required to hold the paintballs as the tubes are all oriented slightly upwardly. A trip wire is used to trigger the puncturing pin. Rearming the device is costly and time consuming.

It is known to provide a toy mine containing a latching mechanism, the toy mine comprising a frusto-conical hollow cover, a base and a cylindrical hollow body affixed to the base wherein the cylindrical body contains a locking/releasing mechanism. The frusto-conical cover is biased outwardly from the base by a compression coil spring. For instance, see the U. S. Patent 3,564,756 issued on February 23, 1971 to Gunpei Yokoi. The toy mine has no means to contain or to eject any particles therefrom.

A device for masking the scent of humans is described in U. S. Patent 5,033,446 issued on July 23, 1991 to Richard Bradt. The device comprises a missile having a perforated cylindrical head and a solid cylindrical shaft, the perforated head adapted to retain a scent masking material therein for diffusion into the atmosphere around a hunter, watcher or animal photographer. The missile is launched from a cylindrical barrel of a launcher having a compressible coil spring contained therein. The device has no means for expelling paintballs or airsoft particles used in war gaming exercises.

A paintball mine is shown in U. S. Design Patent D 366,283 having an openable and closeable cover. The mine appears to have a launcher disposed within the box below the cover but does not show, describe or claim launching paintballs or airsoft particles. The patent was issued on January 16, 1996 to Brett Fernandes.

A paint dispersing training grenade is described in U. S. Patent 5,018,449 issue on May 28, 1991 to Edward Eidson, II. The grenade has a spring biased piston with rack and pinion delayed gates disposed below the piston. When released in a throwing motion, the hand-held lever is released thereby allowing the piston to move against the gates. When the gates have
5 parted to allow the piston to pass thereby, the piston crushes a gel capsule holding the paint to be dispersed. The paint is driven through passages in the body of the grenade thereby squirting out of the ends of the passages. This grenade is as messy to clean and re-arm as the grenades of Filippi and Scheelar, et al., or the mine of Armer, Jr., et al.

Finally, it is known to provide a paintball grenade having means for crushing multiple
10 paintballs that then exude through passages in a band about the central portion of the grenade. For instance, see the U.S. Patent 5,590,886 issued on January 7, 1997 to Craig Lush. It is apparent that this grenade is also messy to clean and difficult to re-arm.

SUMMARY OF THE INVENTION

There is a need for a simple war gaming mine and/or grenade that is easy to load, does
15 not require cleaning after every use and has a modifiable dispersion pattern. Therefore, it is an object of this invention to provide an anti-personnel device for use in war gaming exercises which comprises at least one launching mechanism for launching at least one projectile outwardly from the anti-personnel device wherein the launching mechanism has at least one member biased away from another member in opposing directions with a material affixed to the ends of the members
20 that forms a loop depending from the ends of the members that captures projectiles therein when the members are in a closed, armed position. At least one of the members may have a latching system associated therewith wherein the latching system is appended thereto or lying thereover for holding the members in the closed, armed position.

A feature of this invention is to provide a biasing system for moving at least one member
25 of a launching mechanism of an anti-personel device using at least one of biasing devices selected from the group comprising tension springs, compression springs, leaf springs, gas-operated pistons, electric solenoids, explosive devices or air charged bladders or a combination thereof. Also, the biasing system may retain the launching mechanism in the closed, armed position.

It is another object of this invention to provide an anti-personnel device for use in war gaming exercises that is readily resettable and thus immediately reusable.

Still another object of this invention is to provide an anti-personnel device for use in war gaming exercises that captures projectiles such as paintballs and/or airsoft BB's in a pliable loop of material in the closed, armed position wherein the pliable loop of material is rapidly stretched to a substantially flat, taut condition thus expelling the projectiles from the external surface of the flat, taut material.

Yet another object of this invention is to provide an anti-personnel device for use in war gaming exercises that is light in weight, easy to transport and easy to set up in the gaming field.

A feature of this invention is to provide an anti-personnel device for use in war gaming exercises that is adapted to hold any size of paintballs or airsoft BB's, soap pellets, foam pellets, rubber pellets, Buckshot or other simulated munitions.

Another feature of this invention is to provide an anti-personnel device for use in war gaming exercises that is adapted to hold any combination of large and/or small paintballs, airsoft BB's, soap pellets, foam pellets, rubber pellets, Buckshot or other simulated munitions.

An attribute of this invention is to provide an anti-personnel device for use in war gaming exercises that can be electrically actuated.

Another attribute of this invention is to provide an anti-personnel device for use in war gaming exercises actuated from a remote location.

An important object of this invention is to provide an anti-personnel device for use in war gaming exercises that is safe to use and preferably does not require a per use cost to actuate.

A meaningful object of this invention is to provide an anti-personnel device for use in war gaming exercise that allows use of recycled air-soft BB's or warped or damaged paintballs.

A material object of this invention is to provide an anti-personnel device for use in war gaming exercise that simulates the historic "Claymore" mine used in actual combat situations.

Still another feature of this invention is to provide an anti-personnel device for use in war gaming exercises that comprises an array of launching mechanisms having means for launching multiple projectiles outwardly from the anti-personnel device in a random pattern, each launching

mechanism of the array comprising at least two movable members biased in opposing directions, the members having a material affixed to the ends thereof, the material comprising a loop depending from the ends of the members wherein the material captures the projectiles in the loop when the members are in a closed position, at least one of the members having a latch appended thereto for holding the members in the closed position, the latch having a trip wire associated therewith for releasing the latch when the trip wire is moved a predetermined distance.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a partially exploded front perspective view of a preferred embodiment of one anti-personnel device of this invention after actuation showing a random dispersion of projectiles, with the anti-personnel device also shown in the closed, armed state in dashed lines.

Fig. 2 is a top plan view of an array of launching mechanisms of the anti-personnel devices of this invention thus displaying a means of providing a modified dispersion pattern.

Fig. 3 is a front elevation view of a preferred embodiment of a second anti-personnel device of this invention after actuation showing the random dispersion of projectiles. Parts are broken away to view the internal structure.

Fig. 4 is a front elevation view of a preferred embodiment of a third anti-personnel device of this invention in the closed, armed position with parts broken away to view the internal structure.

Fig. 5 is a perspective view of the latching mechanism of the preferred embodiment with parts of the releasing mechanism exploded from the trigger.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

While the various features of this invention are hereinafter described and illustrated as an anti-personnel device for use in war gaming exercises having at least one spring loaded launching mechanism for launching at least one projectile outwardly from said anti-personnel device, it is to be understood that the various features of this invention can be used singly or in various combinations thereof for an anti-personnel device having a biased launching mechanism for use in war gaming exercises as can hereinafter be appreciated from a reading of the following description.

Referring now to Fig. 2, an array 10 of individual anti-personnel devices 20 of Fig. 1 for use in war gaming exercises may be assembled as shown wherein anti-personnel devices 20 comprising launching mechanisms 120 have means for launching multiple projectiles 30 outwardly from each individual anti-personnel device 20 in a random pattern 31 generally shown in Fig. 1. Random pattern 31 may be altered by altering the number, weight, size and/or mixture of projectiles 30 held within a loop 29 of material 26 and/or by providing a different number or arrangement of individual anti-personnel devices 20 mounted upon a base 11. Anti-personnel device 20 is camouflage in color and may be further disguised from view by a participant such as associating array 10 and mounting base 11 with an artificial or natural bush. Each launching mechanism 120 of array 10 preferably comprises at least two movable members 22, 23 biased in opposing directions, movable members 22, 23 having material 26 releasably affixed to the ends 32, 33 thereof respectively, loop 29 comprising material 26 depending from ends 32, 33 of movable members 22, 23 wherein loop 29 of material 26 captures projectiles 30 in loop 29 when movable members 22, 23 are in a closed and armed position 34 as shown in dashed lines in Fig. 1. At least one of, preferably all, movable members 22, 23, have a latch piece 27 for holding movable members 22, 23 in closed/armed position 34, latch piece 27 having a trip wire 82 associated therewith for releasing latch piece 27 from a plane 35 common with closed, armed movable members 22, 23 when trip wire 82 is moved a predetermined distance. Latch piece 27 may also be affixed to a cover plate 14 of an enclosure 160, enclosure 160 housing launching mechanism 120 simulating the historic "Claymore" mine. As can be readily observed in Fig. 1 in the dashed lines, end 32 of movable member 22 lies adjacent end 33 of movable member 23 thus allowing latch piece 27 to hold both movable members 22, 23 simultaneously. Though only two latch pieces 27 are shown in Fig. 2, it is to be understood that each launching mechanism 120 has a latch piece 27 associated therewith for holding launching mechanism 120 in closed, armed position 34 and for releasing latch piece 27 of movable members 22, 23 when trip wire 82 associated therewith is tripped. Alternately, latch pieces 27 for all launching mechanisms 120 in array 10 may be arranged to be actuated simultaneously from one trip wire 82 by providing an interconnection 61 between adjacent launching mechanisms such that extension of trip wire 82

associated with one launching mechanism 120 also actuates interconnection 61 for each successive launching mechanism 120. Interconnection 61 may be an extension of trip wire 82 passed around a simple pulley 62 supported on base 11. Though array 10 of Fig. 2 shows four anti-personnel devices 20 arranged in a square on mounting base 11, it is fully within the scope of this invention to provide for more or fewer anti-personnel devices 20 arranged on a mounting base 11 or arranged in free standing fashion for simultaneous, sequential or cascading actuation. Furthermore, an array 10 of anti-personnel devices 20 may be arranged on base 11 in linear fashion and actuated in sequence from one end toward the other end. Also, as shown in Figs. 1 & 5, releasing mechanism 150 of anti-personnel devices 20 may be remotely actuated by passing an electrical current through a Nickel/Titanium alloy wire 85 which moves latch hook 28 from engagement with latch piece 27 of any anti-personnel device 20 connected to the electric source 86. Nickel/Titanium alloy wire 85 shrinks upon receiving electrical current therethrough, thereby releasing latch piece 27 and discharging projectiles 30 held within loop 29 of fabric 26.

Referring specifically to Fig. 5, latching mechanism 140 and releasing mechanism 150 have a common trigger lever 46 comprising base arm 141, upright arm 142, pivot brackets 143 with pivot pin holes 144 therethrough for receiving pivot pin 145 therein. Pivot pin 145 also passes through a pivot pin hole associated with mounting plate 21 though this hole is not visible in Fig. 1. Thus trigger lever 46 is rotatably associated with base element 88 of launching mechanism 120 with upright arm 142 extending upwardly alongside launching mechanism 120 for positioning latch hook 28 over terminal end 49 of latch piece 27 when launching mechanism 120 is in closed, armed position 34. Base arm 141 extends transversely under launching mechanism 120 having end 151 of base arm 141 extending beyond base member 89 and suspended slightly therebelow when launching mechanism 120 is in closed, armed position 34. Preferably, trigger lever 46 is journaled in mounting plate 21 having upright leg 142 disposed in a slot 153 in a front wall 154 of mounting base and thus trigger lever 46 has limited movement about pivot pin 145 as end 151 lies just below mounting plate 21 directly below base member 89 and upright arm 142 abuts a portion of wall 154 when launching mechanism 120 is in closed, armed position 34. When launching mechanism 120 is installed in an array 10 on mounting base

11, enclosure 160 may be omitted as shown. In this configuration, latching mechanism 140 has pivot pin 145 journaled in a bracket attached to base element 88 while hinge member 119 receiving latch plate 27 therein is affixed only to backplate 137 of base member 89.

Latching mechanism 140 acts independently of releasing mechanism 150 as latching mechanism 140 will retain launching mechanism 120 in closed, armed position without elements of releasing mechanism 150 installed as terminal end 49 of latch plate 27 is retained under latch hook 28 by the force of movable members 22, 23 attempting to return to deployed position 25. Releasing mechanism 150 though, needs common members latch hook 28 and trigger lever 46 in order to release latch plate 27 from latch hook 28 and deploy launching mechanism 120 to deployed position 25. Therefore, base arm 141 of trigger lever 46 has either or both trip wire 82 and Nickel/Titanium wire 85 affixed to end 151 thereof utilizing screw 147 disposed through washer 146 and into hole 152. Nickel/Titanium wire 85 is affixed to base arm 141 by placing a loop of end 149 under washer 146 and around screw 147 wherein screw 147 is tightened against base arm 141 to affix Nickel/Titanium wire 85 thereto. The end 155 opposite end 149 of Nickel/Titanium wire 85 is then passed through a hole 87 in bottom surface 59 of enclosure 160 and through a tube 188 lying upon bottom surface 59, end 155 affixed to bolt 84 disposed remote from hinge member 119. When also using trip wire 82, end 148 is placed under washer 146 and screw 147 is tightened to affix trip wire 82 to lever 46 with trip wire passing over end 151 of base arm 141, trip wire 82 affixed to a post 50 remote from anti-personnel device 20. Thus, anti-personnel device 20 may be actuated electrically using a remote electric source 86 to charge Nickel/Titanium wire 85 or mechanically by moving trip wire 82 affixed to post 50.

Referring now to Fig. 1, a first preferred embodiment of launching mechanism 120 for launching projectiles 30 outwardly therefrom comprises two movable members 22, 23 biased in opposing directions as shown by arrows 12, 13. Movable members 22, 23 are adapted to move from closed position 34 as shown in dashed lines in Fig. 1 to deployed position 25 shown in solid lines. When deployed rapidly to deployed position 25 by the release of biasing portions 24, material 26 rapidly assumes a taut position between ends 32, 33 of movable members 22, 23 respectively thus expelling projectiles 30 into random pattern 31 shown above launching

mechanism 120. Movable members 22, 23 have material 26 selected from the group comprising cloth, chain mail, parachute fabric or woven webbing affixed to the ends 32, 33 thereof respectively. Preferably, one end 18 of an intermediate layer 16 of material 26 is captured between a top layer 15 and a bottom layer 17 of material 26, top layer 15 and bottom layer 17 affixed together adjacent end 37 thereby forming a closed end passage 40 for attachment to movable member 23 while the other end 19 of lower layer 17 of material 26 is affixed to intermediate layer 16 and upper layer 15 adjacent end 36 thus forming a separate closed end passage 40 for affixing to movable member 22. Sidearm 42 has been broken away on movable member 22 to show closed end passage 40. Ends 36, 37 of material 26 have retainers 38, 39 respectively, passed through closed end passages 40 for retaining material 26 between side arms 41, 42 of movable members 22, 23. Retainers 38, 39 are preferably removably affixed into holes disposed through ends 32, 33 of movable members 22, 23 respectively, retainers 38, 39 thereby being capable of removal and reinstallation for ready replacement of material 26. In Fig. 1, cover plate 14 is shown in the deployed position, that is, substantially perpendicular to the true perspective of the exploded view in order to show details of latch piece 27. When cover plate 14 is laid over movable members 22, 23 thus placing launching mechanism 120 in closed, armed position 34 shown in dashed lines in Fig. 1, material 26 forms loop 29 depending from ends 32, 33 of movable members 22, 23 respectively wherein loop 29 captures projectiles 30 therein.

Referring specifically now to Fig. 1, anti-personnel device 20 is armed by moving movable member 23 inwardly and downwardly opposite arrow 12 while simultaneously moving movable member 22 inwardly and downwardly opposite arrow 13 such that latch piece 27, hence cover plate 14, overlies movable members 22, 23 and latching latch hook 28 of trigger lever 46 over terminal end 49 of latch piece 27 thereby retaining launching mechanism 120 in the closed and armed position 34. It is readily observed that launching mechanism 120 of anti-personnel device 20 may be rearmed by placing projectiles 30 upon outer surface 48 of material 26 after launching mechanism 120 is placed in closed position 34 shown in the dashed lines by pouring projectiles through pour spout 45 in mounting plate 21. Loop 29 of material 26 lies in a cavity 47 formed between movable members 22, 23, inside surface 58 of a back wall 83 and bottom surface 59 of

mounting plate 21, loop 29 extending away from ends 32, 33 having a portion of loop 29 open below pour spout 45. Projectiles 30 are then poured through pour spout 45 into loop 29, loop 29 closed by inside surface 58, projectiles 30 retained in loop 29 of material 26 by inside surface 58 of backwall 83. Alternately, projectiles 30 may be inserted into loop 29 through an opening
5 formed between cover plate 14 and mounting plate 21. Trip wire 82 may then be extended and secured to post 50 remote from anti-personnel device 20 readying anti-personnel device for use in war gaming exercises or alternately, a remote control electric device 86 may have points A, B affixed to attachment points such as bolts 84 on mounting plate 21 with the electrical cable extending from remote control electric 86 to anti-personnel device 20. The details of remote
10 control electric device 86 are not described herein as remote control electric device 86 generally comprises means to selectively connect a load to an electric source through a switch, such means well known in the art. Movable members 22, 23 of launching mechanism 120 are resettable to closed, armed position 34 numerous times thus rendering anti-personnel device 20 substantially indefinitely re-useable.

15 Still referring to Figs. 1 and 2, movable members 22, 23 are rotatably affixed to mounting segments 51, 52 respectively wherein mounting segments 51, 52 are affixed to base elements 88, 89 which are in turn affixed to mounting plate 21. Base elements 88, 89 establish a spaced distance between mounting segments 51, 52 such that ends 32, 33 of movable members 22, 23, when in closed position 34, are spaced apart a distance less than the minimum dimension of the
20 smallest projectile 30 to be used in anti-personnel device 20. Of course, mounting segments 51, 52 may be formed integral with mounting plate 21 thus reducing manufacturing effort, however, in the preferred embodiment, mounting segments 51, 52 and base elements 88, 89 are formed from 1/2" wide, 1/8" thick bar stock. Mounting segments 51, 52 are preferably formed into U-shaped form having upright legs 104 spaced apart a distance at least equal to the width of material
25 26 while base elements 88, 89 are formed to conform to bottom surface 59 of mounting plate 21. Mounting segments 51, 52 have biasing portion 24 disposed between the upright legs 104 thereof, biasing portion 24 adapted to rapidly bias movable members 22, 23 from closed position 34 to deployed position 25 respectively. In the preferred embodiment of Fig. 1, biasing portion 24 is

a 1/8" diameter wire, 1/2" outside diameter torsion spring 53 having one end 133 in contact with at least one of base elements 88 or 89 and the other end 132 in contact with a cross bar 105 extending between separate side arms 41, 42 of movable members 22, 23. Though biasing portion 24 is preferably a torsion spring 53, biasing portion 24 may alternately be a tension spring, a compression spring, a leaf spring, gas-operated piston in a cylinder or similar biasing means having the opposite ends thereof associated with movable members 22, 23 and base elements 88, 89 as can be readily appreciated by those skilled in the art of biasing elements in opposed directions. Torsion spring 53 may have an adjusting means, not shown in Fig. 1, that may be rotated about the respective axis 56, 57 of movable members 22, 23 for adjusting the torsional force between base elements 88, 89 and movable members 22, 23 respectively, however, torsion springs 53 of each launching mechanism 120 preferably have a fixed spring constant selected from among a shipment of torsion springs 53 such that deployed position 25 is generally directly upwardly from mounting plate 21, however, it is within the scope of this invention to provide for a different spring constant for torsion springs 53 within any anti-personnel device 20 to provide for a different dispersion of projectiles 30.

Though the preferred embodiment of the anti-personnel device 20 has been described as mechanically actuated by the use of biasing means associated with movable members 22, 23, it is within the scope of this invention to move movable members 22, 23 in directions 13, 12 respectively using gas-operated pistons, electric solenoids, explosive devices, air charged bladders or a combination thereof. Thus, the use of gas-operated pistons, electric solenoids, explosive devices, air charged bladders or a combination thereof will obviate the need for latching mechanism 140 and releasing mechanism 150 as these firing devices may either also hold movable members in closed, armed position or be disposed between material 26 and bottom surface 59 of base plate 21. For instance, biasing portions 24 may be omitted from axles 135 and an explosive charge 156 placed on bottom surface 59 of base plate 21 with leads connected to bolts 84 for actuation by remote electrical source 86. In this embodiment, movable members 22, 23 move freely upon discharge of explosive charge 156 thus moving material 26 to deployed position 25 though deployed position 25 may be displaced angularly away from the straight up position

shown in Fig. 1 merely by placing explosive charge 156 off center on bottom surface 59. Use of gas-operated pistons, electric solenoids, explosive devices, air charged bladders or a combination thereof adds a small per-use cost for actuation of operating anti-personnel device 20 over the cost of projectiles 30.

5 In another embodiment, movable members 22, 23 may be so constructed and mounted to mounting segments 51, 52 that movable members 22, 23 lie in an "overcenter" relationship wherein latching mechanism 140 is unnecessary to hold movable members 22, 23 in closed, armed position 24. Trip wire 82 of releasing mechanism 150 may then be affixed directly to at least one of retainers 38, 39 wherein a slight pull thereon will release movable members 22, 23 toward
10 deployed position 25 thus scattering projectiles 30 in random pattern 31.

Anti-personnel device 20 simulating a "Claymore" land mine comprising one launching mechanism 120 is constructed having axes 56, 57 of torsion springs 53 spaced about 6 inches apart by mounting segments 51, 52 mounted at opposite ends 131 of base elements 88, 89. Base elements 88, 89 have opposite ends 131 bent slightly away from a flat plane in order to conform
15 to bottom surface 59 of mounting plate 21, mounting plate 21 formed of thermoplastic material in a shape substantially similar to a practice "Claymore" mine. U-shaped mounting segments 51, 52 are affixed adjacent ends 131 of base elements 88, 89 with legs 104 of mounting segments 51, 52 extending generally upwardly from base elements 88, 89. At least one of base elements 88, 89 or mounting segments 51, 52 is affixed to mounting plate 21 through bottom surface 59 with
20 suitable fasteners, preferably pop-rivets. Side arms 41, 42 of movable members 22, 23 are preferably also formed from 1/2" wide, 1/8" thick steel bar stock and are joined approximately midpoint with cross bar 105 formed from the same material. Preferably, cross bar 105 is welded to side arms 41, 42 and thus spaces side arms 41, 42 apart approximately 3 inches, enough to fit material 26 therebetween. Movable members 22, 23 are rotatably associated with upright legs
25 104 of mounting segments 51, 52 with axles 135 passed through and affixed to upright legs 104 of upright members 51 and 52. Torsion spring 53 is disposed around axle 135 at assembly of movable members 22 and 23 to mounting segments 51, 52, torsion spring 53 having one end 132 bearing against crossbar 105 spanning between spaced apart side arms 41, 42 of movable

members 22, 23 and the other end 133 thereof bearing against one of base elements 88, 89, torsion spring 53 having an initial bias to provide approximately 10 pounds of force at retainers 38, 39 disposed through side arms 41, 42 of each movable member 22, 23. Side arms 41, 42 of movable members 22, 23 are substantially the same length, and as axles 135 are spaced apart slightly more than twice the length of side arms 41, 42, ends 32, 33 of movable members 22, 23 respectively are adjacent but not overlapped when launching mechanism 120 is in closed position 34. Since ends 32, 33 are adjacent when in closed position 34, latch piece 27 is then adapted to lie over ends 32, 33 of movable members 22, 23 having terminal end 49 thereof captured by latch hook 28 of a latching mechanism 140 and thus latch piece 27, when engaged by latch hook 28 holds movable members 22, 23 in closed, armed position 34. Material 26 is preferably formed from 3 inch wide, 18 inch long piece of heavy, square woven fabric having closed end passages 40 sewn into each end 36, 37 for accepting retainers 38, 39 therein, material 26 plied in three layers between closed end passages 40 as hereinbefore described. Closed end passages 40 are formed by stitching together layers 15 - 17 across material 26 as shown with stitching 134 continuing along the side edges of material 26 to provide an integral planar surface 48. Retainers 38, 39 are preferably straight 16d nails with threaded open ends though 3/16 inch diameter, 3 1/4 inch long rods or dowels may be substituted therefor. The tension between ends 36 and 37 may be up to 20 pounds force per inch of width, though the rapid straightening of material 26 at lesser force between ends 36, 37 is sufficient to provide significant propelling force for projectiles 30. Mounting segments 51, 52 and base elements 88, 89 may be formed in one piece with a specified distance between axes 56, 57 and may additionally be formed integral with mounting plate 21. Likewise, cover plate 14 and latch piece 27 may be formed as an integral unit to reduce production costs. Preferably, torsion springs 53 are formed to provide for specific torsional force to separate movable members 22, 23 at a speed to propel projectiles held within loop 29 to a distance of at least 50 feet. As anti-personnel device 20 propels a plurality of 0.68 inch diameter paintball projectiles to a distance of at least 50 feet in an arc of 60 degrees with sufficient residual velocity to rupture each paintball when a person or object is struck, anti-personnel device approximates the actual operation of the historic "Claymore" mine for use in paintball exercise

fields. Anti-personnel device 20 may use projectiles selected from the group comprising 0.68 inch diameter paintballs, hollow elastomeric pellets, metal BB's, solid elastomeric BB's, 0.25 diameter paintballs, soap pellets, foam pellets, rubber pellets, Buckshot or other simulated munitions in any combination and additionally can easily make use of recycled air-soft BB's or warped or damaged paintballs.

Though the above embodiment has been described having two biasing portions 24 forcing two movable members 22, 23 in opposing directions, it is fully within the scope of this invention to use any number of biasing portions 24 and/or any number of movable members 22, 23 having material 26 affixed thereto. For instance, is possible to provide four movable members similar to movable members 22, 23 biased apart in the cardinal directions within a single plane by providing another material 26 affixed to another set of movable members (not shown) in a manner described above for movable members 22, 23.

Mounting plate 21 and cover plate 14 together comprise enclosure 160 for launching mechanism, mounting plate 21 and cover plate 14 preferably formed into the shell like forms shown in Fig. 1 and may be injection or compression molded or cast from thermoplastic material, laid up in layers of fiberglass with resin, die cast from metals, stamped from sheet metal or bent into form from sheet metals and welded or riveted together. Preferably, mounting plate 21 and cover plate 14 are precision cast in silicone molds from two part urethane resin and allowed to air cure though accelerated curing by microwave or heated oven is contemplated within the scope of this invention. Latch piece 27 is preferably the extended plate of a standard steel screen door hinge and is permanently affixed to cover plate 14 by gluing latch piece 27 thereto although latch piece 27 may be affixed in any other suitable manner. Latch piece 27 has terminal end 49 shaped to receive latch hook 28 thereover to retain cover plate 14 in position over movable members 22, 23 when launching mechanism 120 is in closed position 34. Mounting plate 21 has hinge member 119 affixed to back wall 83 of mounting plate 21, hinge member 119 and latch piece 27 receiving a hinge pin 136 therethrough allowing latch piece 27 to be removably, rotatably affixed to hinge member 119 and thus cover plate 14 is removably, rotatably affixed to mounting plate 21. Preferably, hinge member 119 is affixed to back wall 83 with machine bolts 84 passing through

backwall 83, hinge member 119 and into a back piece 137 of base member 89, one machine bolt 84 also functioning as one attachment point for the electrical cable from remote electric source 86. Anti-personnel device 20 may have foldable legs 138, 139 affixed to back wall 83 of mounting plate 21 for standing anti-personnel device 20 upon a deployment surface in an attitude
5 similar to the attitude of anti-personnel devices 20 mounted upon mounting base 11.

In another embodiment of anti-personnel device 20 like a Claymore mine for use in war gaming exercises, launching mechanism 120 comprises a movable member biased in a direction away from a fixed member wherein the members have a material affixed to the ends thereof. Referring now to Fig. 3, anti-personnel device 70 comprises movable member 72 and fixed
10 member 71 wherein movable member 72 is biased in a direction away from fixed member 71 with a biasing member 74. As shown in Fig. 3, the preferred biasing member 74 is a coiled compression spring fixed to both members 71, 72 wherein biasing member 74 is adapted to be compressed to a short stack height and contained within the peripheral confines of members 71 and 72. A latching/release mechanism 67 holds movable member 72 in close proximity to fixed
15 member 71 and a trigger 75 is associated with latching/release mechanism 67 to releasably separate movable member 72 from fixed member 71. Fixed member 71 has material 76 affixed to the outer peripheral surface 69 with a band 77 encircling a base portion 65 of fixed member 71 while movable member 72 has material 76 affixed to an inner peripheral edge 68 with an internal ring 78. Material 76 may have retainers 81 disposed in passages in ends 79, 80 thereof
20 wherein retainers 81 assist in retaining material 76 onto members 71, 72. Material 76 forms a loop within the peripheral internal cavity 66 similar to the peripheral inner cavity 100 of Fig. 4, to be described hereinafter, when movable member 72 is depressed toward fixed member 71 and latched thereto with latching/release mechanism 67. Material 76 is thus suspended from inner peripheral edge 68 of movable member 72 depending downwardly and affixed to outer peripheral
25 surface 69 of fixed member 71 wherein material 76 captures projectiles in the loop formed when material 76 is folded within internal peripheral cavity 66 when members 71, 72 are in a closed position. Preferably, there is a well 63 disposed within top surface 73 of fixed member 71 and a well 64 within movable member 72 to fold material 76 thereinto and to releasably retain

projectiles 30 therewithin when movable member 72 is moved into a latching relationship with fixed member 71. Latching/release mechanism 67 holds movable member 72 to fixed member 71 thus holding members 71, 72 in the closed, armed position wherein latching/release mechanism 67 may have a trip wire similar to trip wire 82 in Figs. 1 and 2 associated therewith for releasing latching mechanism 67 when trip wire 82 is moved a predetermined distance or may rely upon trigger 75 to actuate latching/release mechanism 67. In the anti-personnel device 70 of Fig. 3, material 76 is preferably a cylinder of material with cylindrical passages within the ends 79, 80 thereof for receiving retainers 81 therein. Band 77 is preferably force fit over outer peripheral surface 69 of base portion 65 of fixed member 71, however, use of screw clamps, banding or other means is within the scope of this invention. Preferably, the diameter of internal peripheral edge 68 of movable member 72 is smaller than the diameter of outer peripheral surface 69 of fixed member 71 such that when material 76 extends from its folded posture within internal peripheral cavity 66 to the taut position shown in Fig. 3, projectiles 30 carried with material 76 are projected at least slightly upwardly. As projectiles 30 are captured in a loop of material 76 within internal peripheral cavity 66, projectiles 30 will be spread out peripherally about well 63 in base portion 65 and thus are equally projected outwardly approximately the same distance in substantially all directions thus providing a great improvement in the effective impact radius than is presently available in the prior art or in practice in war gaming exercises. As with anti-personnel device 20 described above, anti-personnel device 70 may use projectiles selected from the group comprising 0.68 inch diameter paintballs, hollow thermoplastic pellets, metal BB's, solid thermoplastic BB's or 0.25 diameter paintballs, soap pellets, foam pellets, rubber pellets, Buckshot or other simulated munitions in any combination and additionally can easily make use of recycled air-soft BB's or warped or damaged paintballs in any combination. Preferably, latching mechanism is identical to the latching and release mechanism of the aforementioned U. S. Patent 3,564,756 this patent fully incorporated into the instant invention by this reference thereto.

Yet another anti-personnel device operating on substantially the same principle as the above described anti-personnel devices 20, 70 is a grenade like anti-personnel device 90 as shown in Fig. 4 in its closed and armed state with portions broken away to view the internal portions of

anti-personnel device 90. Anti-personnel device 90 has a launching mechanism that comprises two movable members 91, 92 adapted to be spread apart by a biasing member 94 affixed to movable members 91, 92 similar in operation to the launching mechanism utilized in Fig. 3. A loop 99 of material 96 is formed within peripheral internal cavity 100 by affixing ends 93, 95 of material 96 to internal peripheral surfaces 98, 97 of movable members 92, 91 respectively with bands 102, 101 respectively. As movable members 91, 92 separate rapidly upon release of release mechanism 103, projectiles 30 carried within loop 99 are propelled outwardly in substantially all directions. As projectiles 30 are propelled away from anti-personnel device 90 before rupture of the capsules comprising projectiles 30, clean up prior to reuse is completely avoided both internally and externally of the grenade body. Thus, anti-personnel device 90 may be rearmed and reused in the field merely by forcing movable members 91, 92 toward each other compressing biasing member 94, loading projectiles 30 within loop 99 formed as material 96 is folded into internal peripheral cavity 100. Latching and release mechanism 103 is then re-latched thus arming anti-personnel device 90 for reuse. Latching and release mechanism 103 may be substantially identical to latching/release mechanism 67 of anti-personnel device 70 described above and shown in Fig. 3, however, a unique latching and release mechanism 103 may be used with anti-personnel device 90.

With respect to the above description, it is to be realized that the optimum dimensional relationships for the parts of the invention to include variations in size, materials, shape, form, function and manner of operation, assembly and use are deemed readily apparent and obvious to one skilled in the art and all equivalent relationships to those described in the specification and illustrated in the drawings are intended to be encompassed by the present invention.

While the present invention has been described with reference to the above described preferred embodiments and alternate embodiments, it should be noted that various other embodiments and modifications may be made without departing from the spirit of the invention. Therefore, the embodiments described herein and the drawings appended hereto are merely illustrative of the features of the invention and should not be construed to be the only variants thereof nor limited thereto.